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Towards the development of a coding scheme for the quantification of interpersonal empathic behaviour

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How can we examine empathic behaviour at the interpersonal level?

The phenomenon of empathy is a complex and ambiguous phenomenon, which is currently being defined in numerous different ways, resulting in the use of many different assessment approaches.

However, as most approaches focus on the personal outcomes for the empathiser, there is a need for greater focus on the examination of empathic behaviour at the interpersonal level, in order to enhance our understanding of the temporal dynamics of the empathising process in a live, evolving interaction (Main, Walle, Kho & Halpern, 2017).

Several studies were conducted to enhance current understanding of the communicative behaviours that signal empathic understanding to a conversational partner, across an everyday interaction. These behaviours were integrated into a coding scheme.

The Interpersonal Coding of Empathy Scheme

was developed for the operationalisation and quantification of interpersonal empathic behaviour in a social interaction.

Designed to be flexible, the scheme can be adapted and used in different ways to suit a research team's resource and time constraints.

Study 1

OBJECTIVE: To examine which behaviours are associated with observer impressions of empathy

Method

Videotaped material

- 8 naturalistic social interactions between English-speaking pairs of friends (ILHAIRE database: McKeown *et al*., 2012) reviewed for empathic behaviour
- **Limited experimental manipulation** imposed: dyads simply instructed to have a conversation for 1 hour
- **Conversational dynamic**: friends engaged in typical day-to-day social interaction. Separate videos of each interlocuter combined into single split-screen image of dyad.
- 69 thin-slice clips selected to cover a range of empathic behaviour.

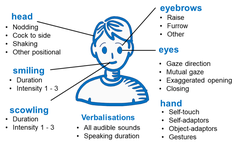
Empathic behaviour defined as **the degree to which an interlocuter displayed an understanding of their partner's thoughts and feelings by responding to them in an emotionally-appropriate way.**

Interlocuter nonverbal expressivity

Online raters judged (ICC = 0.89) rated each interlocuter's degree of **nonverbal expressivity** on a slider scale from 0 ("*not at all expressive*") to 100 ("*highly expressive*"). Raters' scores averaged to compute a mean expressivity score for each interlocuter.

20% of clips also annotated by blind coders for extensive set of nonverbal behaviours (Krippendorff's α = 0.63) to corroborate online rater scores.

Duration values for all behaviours averaged to compute a mean score of overall nonverbal expressivity for each interlocuter.



Annotation-based estimates of nonverbal expressivity strongly and positively associated with online raters' impressions, ($r(28) = .78$, $p < .001$).

Dyadic conversational dynamic

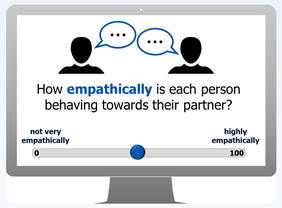
Online raters also judged (ICC = 0.88) the degree to which each conversation had been **shared equally by both members of a dyad**, on a slider scale marked from 0 ("*dominated by one person*") to 100 ("*shared equally, neither person was more dominant than the other*"). Raters' scores averaged to compute a mean conversational dynamic score for each dyad (higher score representing a more equally shared dynamic).

Participants

- Online participants recruited via Prolific Academic.
- 9 groups (at least 25 participants) rated groups of 10 clips
- Pre-screening measures utilised to prevent multiple participation sessions; attentional and timing checks included to identify careless submissions.
- Final participant sample: **293** (99.7% first-language English-speaking, 48.7% female, and 73.4% non-student)

Perceived empathic behaviour intensity rating task

Participants **not** provided with a definition of empathy.



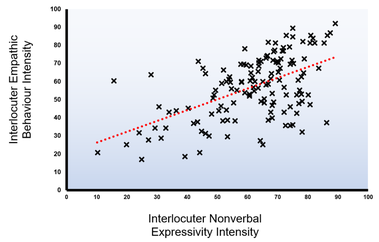
- Participants' ratings averaged to compute a mean perceived empathic behaviour score for each **interlocuter** in each clip.
- Scores for both interlocuters totalled to compute a perceived **dyadic** empathic behaviour score for each clip.

Empathy definition rating task

Participants read a series of statements about empathy, including our definition, and rated how well each statement described empathy.

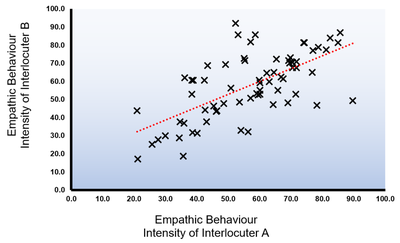
Results

Participants' empathic behaviour intensity ratings were highly reliable (ICC = 0.91).



Perceived interlocuter expressivity intensity levels were positively associated with observer's perceptions of empathic behaviour intensity ($r(136) = .55$, $p < .001$).

Dyadic conversational dynamic scores were also positively associated with perceptions of dyadic empathy ($r(67) = .41$, $p < .001$).



Interlocuters' levels of empathic behaviour strongly correlated, ($r(67) = .65$, $p < .001$).

Our definition of empathy (as a process of understanding your partner's thoughts and feelings and responding appropriately) achieved a strong agreement rating of 84.3/100

Study 2

OBJECTIVE 1: To replicate findings of Study 1
OBJECTIVE 2: To validate a coding scheme developed for the examination of interpersonal empathic behaviour across time.

Independent coders were asked to code the presence of empathy in accordance with the coding scheme. These estimates were corroborated against the "ground-truth" ratings of multiple untrained online participants.

Method

Videotaped material

Sourced from ILHAIRE and NoXi (Cafaro *et al*., 2017) databases.
30 thin-slice clips sampled at same timepoints in each interaction

Experimental manipulation:
NoXi dyads "novice-expert" dynamic

Conversational dynamic:
power-matched versus power-contrast

Interlocuter nonverbal expressivity

3 internal coders rated (ICC = 0.78) rated each interlocuter's degree of **nonverbal expressivity**

0 — 100
Not at all expressive — Highly expressive

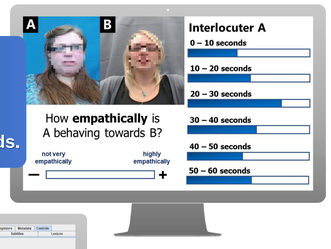
Interlocuter empathic conversational scores

3 internal coders also judged (ICC = 0.82) the degree to which each interlocuter played an appropriately active and equal role in the conversation.

0 — 100
Not active/ Unequal player — Active/ Equal player

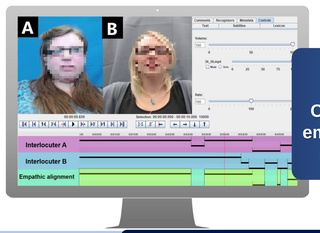
Coding Type 1

Continuous rating of empathic behaviour intensity every 10 seconds.



Coding Type 2

Categorical annotation of empathic behaviour across duration of interaction.



Participants

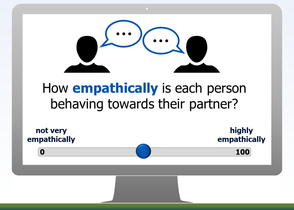
- Online participants recruited via Prolific Academic.
- 6 groups (at least 25 participants) rated groups of 8 clips
- Pre-screening measures utilised to prevent multiple participation sessions; attentional and timing checks included to identify careless submissions.
- Final participant sample: **162** (96.9% first-language English-speaking, 59.3% male, and 30.8% non-student)

Participants provided with our operationalisational definition of empathy in series of simple statements and diagrams.

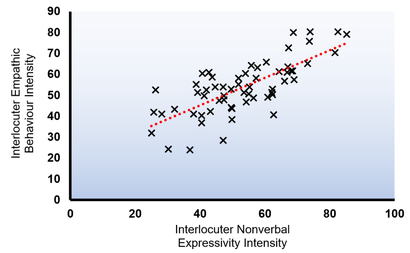
Empathic behaviour defined as **the degree to which an interlocuter displayed an understanding of their partner's thoughts and feelings by responding to them in an emotionally-appropriate way.**

Perceived empathic behaviour intensity rating task

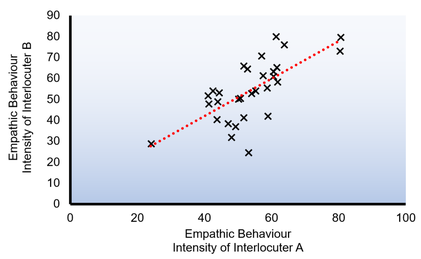
Participants' ratings averaged to compute a mean perceived empathic behaviour score for each **interlocuter** in each clip.



Results



Perceived interlocuter expressivity intensity levels were positively associated with observer's perceptions of empathic behaviour intensity ($r(58) = .74$, $p < .001$).



Interlocuters' levels of empathic behaviour strongly associated, ($r(28) = .69$, $p < .001$).

Interlocuter's empathic conversational behaviour scores also strongly correlated with perceived empathic behaviour scores, ($r(58) = .64$, $p < .001$).

Comparison of coders' empathic behaviour ratings with online participants' "ground-truth" ratings

Empathic Behaviour Rating Method	Online empathic ratings	Coding Type 1	Coding Type 2
	"ground-truth"	Continuous Empathic Behaviour Intensity Rating Per 10 seconds	Categorical annotation of empathic behaviour across duration of interaction
Raw ratings	**ICC = 0.90**	**ICC = 0.88**	**α = 0.435**
Finalised scores	**n/a**	**ICC = 0.90**	**ICC = 0.61**
Association with "ground-truth" ratings	**n/a**	***r*(18) = .81, *p* < .001**	***r*(18) = .65, *p* < .001**

Discussion

Indicators of "empathic" behaviour

- Nonverbal expressivity → Higher expressivity = higher empathy **BUT:** dependent on **trait expressivity** of interlocuter and **context**! (It is not always empathic to be highly expressive)
- Being an empathic conversational partner → An empathic conversation partner takes an appropriately active and engaged role in a conversation **without dominating**.
- "Empathic matching" → Empathy is a dynamic and shared phenomenon: we are **responsive to our partner's empathy level**

Development of coding scheme

Cognitive attunement · Emotional attunement · Engagement behaviours · Nonverbal expressivity · Being an empathic conversational partner

Validation of coding scheme

Next steps:
To extend generalisability

Varied dyadic dynamics:
- Dyad composition: .e.g. child-adult, spousal pairs, ingroup-outgroup contact experiences
- Dyads from a range of backgrounds and cultures
- Dyads engaged in serious and sad conversational topics, dyads engaged in a conflict, dyads negotiating a compromise.

Potential applications of the Interpersonal Coding of Empathy (I.C.E.) Scheme:

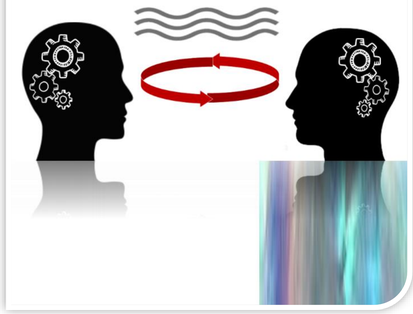
- Examination of **dyadic empathic synchrony** levels over time.
- Identification of the **duration** of time people engage in different levels of empathy and identification of points in the interaction at which **empathy levels become aligned**.
- Identification of **specific nonverbal behaviours** associated with high intensity empathic behaviour in particular contexts.
- Implementation of **empathic behaviour skills training**: relationship counselling, bullying interventions
- The **improvement of "empathic" tech**: virtual tutors, socio-educational interactive companions, emotionally-responsive robotic care assistants for the elderly, nonverbally empathic avatars for use in Virtual Reality health and psychosocial interventions

Coding Type 1 — Higher ICC
Continuous rating of empathic behaviour intensity per 10 seconds

Coding Type 2 — Lower α
Categorical annotation of empathic behaviour

Interpersonal Coding of Empathy Scheme

(Spencer, Main & McKeown, in preparation)



Conclusions

We present a validated, open-source, evidence-based approach for the coding and quantification of interpersonal behaviour.

Designed to be flexible, the scheme can be adapted to suit a research team's resources and time constraints. Coders rating longer durations of empathic behaviour can rate their general impressions of empathic behaviour per 20 seconds, 30 seconds, 60 seconds …etc.

The scheme provides a relatively efficient means of obtaining continuous empathic behaviour scores and/or duration values, allowing the in-depth examination of changing empathy levels over the course an interaction.

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